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AUTHOR Beaulieu, Barbara; And Others
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ABSTRACT

This unit of instruction on electrical energy usage in the home was designed for use by home economics teachers in Florida high schools and by home economics extension agents as they work with their clientele. It is one of a series of 11 instructional units (see note) written to help teachers and agents to educate their students and clients about the problems of energy shortages and strategies for energy conservation and management. Topics covered in this unit include reading an electrical meter, computing the kilowatt hour usage of household appliances, determining the cost of operating household appliances, and selecting the most energy-efficient appliances by reading energy efficiency labels. The unit contains student performance objectives, content information, teaching-learning activities, student handouts, transparency masters, and evaluation instruments. (KC)

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LOW ENERGY TECHNOLOGY
A UNIT OF INSTRUCTION
IN
HOUSING AND HOME ENVIRONMENT
ELECTRICAL ENERGY USAGE

Developed by

Barbara Beaulieu
William J. Becker
Kathleen E. Wood

Department of Agricultural and Extension Education
Department of Home Economics
Institute of Food and Agricultural Sciences
University of Florida
Gainesville

1980

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INTRODUCTION

The energy crisis which Americans have and will continue to experience requires - and may soon demand - efforts by all of us to make more efficient use of our energy resources. As energy sources dwindle, supplies decrease and prices increase, consumers are faced with difficult decisions regarding their personal consumption of energy and the impact the energy problem will have on their lives.

Consumers have felt the impact of the energy problem in many ways. Their electric bill has soared, doubling or tripling in many homes in recent years. As electricity costs increase, consumers will need to understand their electrical bill, how it is calculated and where all that electricity is being used. Understanding the use of electricity by various appliances will enable a consumer to purchase appliances more effectively and use them more efficiently.

This unit of instruction on Electrical Energy Usage includes four student performance objectives. Upon completion of this unit, the student will be able to:

1. Read an electric meter and determine the number of kilowatt hours used when given electric meter readings.
2. Given five household appliances, compute the kilowatt hour usage of the appliances when given the watts and the amount of time used.
3. Determine the cost of operating a household appliance when given the wattage, amount of time used, and the cost per KWH.
4. Read energy efficiency labels and select the most energy efficient appliance when given sample energy guide labels from similar appliances.

This unit of instruction energy guide includes student performance objectives, content information, teaching-learning activities, student handouts, transparency masters and evaluation instruments. Use a copy machine to reproduce the student handouts and make the transparencies.

This unit of instruction was designed for use by home economics teachers in Florida high schools and by extension home economics agents as they work with youth and adults. It would be appropriate for use by any professional home economist as they work with their clients. This unit of instruction was developed by the Department of Agricultural and Extension Education and Department of Home Economics, Institute of Food and Agricultural Sciences as part of their Low Energy Technology Program.

STUDENT PERFORMANCE OBJECTIVES	CONTENT	TEACHING-LEARNING ACTIVITIES
Upon completion of this module the student will be able to: 1. Read an electric meter and determine the number of kilowatt hours used when given electric meter readings.	An electric meter is used to measure the amount of electricity consumed by a household. You can read your own meter to calculate the amount of electricity being used. Electric meters have 4 or 5 dials or can have digits. Watts are a measurement of energy usage. A kilowatt is 1000 watts. To determine the number of kilowatts used by an appliance, divide the number of watts used by 1000. The numbers of a meter are read like a clock face. Note: Some dials are read clockwise, others counter-clockwise. The dials are read from right to left and the numbers are written in the same order as read. If it is difficult to tell if a hand has passed a number, the dial to the right will tell you. Has it passed 0 or not? If the hand is between two numbers, record the lowest number. To determine the amount of electricity that has been used over a given period of time, subtract the first reading from the second reading to find the difference.	Explain the use and purpose of an electric meter and the benefits of reading your own meter. Show transparency 1A to explain the measurement of kilowatts. Use transparency 1B to show an example of how kilowatts are figured. Demonstrate how to read an electric meter by using a water soluble pen to mark the dials on transparency 2. (These can be wiped off with a damp cloth and remarked for additional readings.) Use a laminated meter board for students to practice reading a meter. Use transparency 3 to show how to determine the amount of energy that has been used. Use a water soluble pen.

UNIT: ELECTRICAL ENERGY USAGE

LOW ENERGY TECHNOLOGY
HOUSING AND HOME ENVIRONMENT

MODULE: READING AN ELECTRIC METER

STUDENT PERFORMANCE OBJECTIVES	CONTENT	TEACHING-LEARNING ACTIVITIES
8		9 Observe an actual electric meter to see the meter turning. Record the reading. Use the school or building electric meters. Handout: "How to Read Your Electric Meter". Do the practice problems. Evaluation: Meter Reading Problems.

LOW ENERGY TECHNOLOGY
HOUSING AND HOME ENVIRONMENT

MODULE: ELECTRICAL USAGE BY
APPLIANCES

UNIT: ELECTRICAL ENERGY USAGE

STUDENT PERFORMANCE OBJECTIVES	CONTENT	TEACHING-LEARNING ACTIVITIES
Upon completion of this module the student will be able to: 2. Given five household appliances, compute the kilowatt hour usage of the appliances when given the watts and the amount of time used.	Electric meters measure the amount of energy used in kilowatt hours. Kilowatt hours are figured by multiplying the number of kilowatts used by the amount of time in hours. Electric companies bill for the use of electricity by number of kilowatts used. Most appliances are labeled as to the number of watts/kilowatts they use, and the amount used varies with each appliance. Appliances that produce heat generally use more watts in the same amount of time than those that are motor driven. Some appliances cycle "on and off", and therefore do not use electric energy the entire time they are "on".	Explain how to figure kilowatt hours when given kilowatts and the time. Use transparencies 4A and 4B to show mathematics of electrical usage by appliances. Collect and show nameplates of various appliances (e.g. hand mixer, toaster, coffee pot, can opener, corn popper, hair blower, slow cooker, blender, & hair styling equipment, etc.) and how to locate and read the number of watts used by the appliance. Handout: How Much Does It Cost to Operate Your Appliances? Read & Discuss. Show transparency 5A to explain procedure of calculating KWH's used when an appliance cycles. Show example with transparency 5B. Handout: "Wattage Hunt". Divide class into groups to go on a "Wattage Hunt" looking for wattages on appliances in the laboratories or at home. The first group to find all of the wattages listed on the "Wattage Hunt" wins.

STUDENT PERFORMANCE OBJECTIVES	CONTENT	TEACHING-LEARNING ACTIVITIES
		Take Handout "My Energy Consumption" home and complete. Handout: "KWH Used to Prepare Food." Divide the class into the number of groups as kitchens in the foods laboratory. Each group prepares the same food twice by cooking it in two different appliances. (A different food assigned to each group.) The students are to keep track of the time it takes to cook the food (including any preheating of appliances). By finding the wattage of the appliance and the time the appliance was on (taking into account if there was cycling) determine the number of KWH's used to cook each food. Each group is to present their findings to the class. Evaluation: How Many KWH's?

LOW ENERGY TECHNOLOGY

UNIT: ELECTRICAL ENERGY USAGE

HOUSING AND HOME ENVIRONMENT

MODULE: ELECTRICAL APPLIANCES

STUDENT PERFORMANCE OBJECTIVES	CONTENT	TEACHING-LEARNING ACTIVITIES
Upon completion of this module the student will be able to: 3. Determine the cost of operating a household appliance when given the wattage, amount of time used, and the cost per KWH.	Cost of Electricity -Single vs. variable rates -More/less KWH's used the higher/lower the rate -Fuel adjustment rate -Other costs By determining the cost of using an electrical appliance and comparing costs between similar appliances you can choose the one that costs the least amount to operate. The cost of energy consumed by an appliance is figured by multiplying the number of KWH s used by the cost per KWH.	Have students bring electric bill stubs from home and determine the present cost of electricity per KWH charged by the local electric company. Explain how to calculate the cost of energy consumed by an electrical appliance. Show Transparency 6A. Provide an example using Transparency 6B. Have the students read the school's electric meter. Compare with an earlier reading. Using the local cost per KWH, have students figure the cost for the amount of energy consumed over that period of time. Have students complete the Handout "Watt's My Cost?" Use Handout "Average Annual Electricity Cost For Household Appliance." Evaluation: Complete Handout: "Problems in Calculating KWH's Costs."

LOW ENERGY TECHNOLOGY

HOUSING AND HOME ENVIRONMENT

MODULE: SELECTING ENERGY EFFICIENT APPLIANCES

UNIT: ELECTRICAL ENERGY USAGE

STUDENT PERFORMANCE OBJECTIVES

CONTENT

TEACHING-LEARNING ACTIVITIES

Upon completion of this module the student will be able to:

4. Read energy efficiency labels and select the most energy efficient appliance when given sample energy guide labels from similar appliances.

Energy efficiency labeling is mandatory for major household appliances:

- refrigerators
- refrigerator-freezers
- freezers
- dishwashers
- water heaters
- clothes washers
- room air conditioners
- furnaces

Three different types of labels provide information about the energy use of the appliance.

- Yearly Cost/Use Cost Label
- EER Label
- Generic Label

These labels will help a consumer when purchasing an appliance by providing estimated yearly energy costs and how this particular appliance compares to similar makes and models.

A table with energy costs indicates the average cost to operate the appliance for a year.

Labels on continuous running appliances such as refrigerators and hot water heaters give a yearly total whereas appliances such as dishwashers and clothes washers give costs based on frequency of use.

Describe how new energy labeling on the mandatory appliances will help the consumer when doing comparison shopping.

Show slide/cassette set:

"Conserving Energy Through Appliance Labeling."*

Have students watch for parts of labels, how to read the label and to be able to distinguish between the three types of labels and to which appliances they apply.

Handout "Yearly Cost Label", "Use Cost Label" and "Energy Efficiency Ratio Label" or display as transparencies. Explain how to read the labels.

Explain about the Generic Label and how it is used.

Handout "How to Use the Energy Guide Label" or use as a transparency. Explain how this guidesheet can help in determining which model is most energy efficient.

Using two overhead projectors, show guidesheet and labels for the two refrigerator-freezers and work through the guidesheet for similar models.

UNIT: ELECTRICAL ENERGY USAGE

LOW ENERGY TECHNOLOGY
HOUSING AND HOME ENVIRONMENT

MODULE: SELECTING ENERGY
EFFICIENT APPLIANCES

STUDENT PERFORMANCE OBJECTIVES

CONTENT

TEACHING-LEARNING ACTIVITIES

Air conditioners and furnaces vary with the climate so they have an Energy Efficiency Ratio (EER) number to be compared with similar brands and models. The higher the EER number the more efficient is the operation of the appliance.

These labels are to help consumers make a choice of the most energy efficient appliance for their money.

Evaluation: Give students three copies of guidesheets and sample labels for two dishwashers, two air conditioners and two refrigerator-freezers. Students are to compute the cost and determine which would be the better buy for each pair of appliances.

After students have completed the guidesheets, discuss the process in class to figure which appliance would be the most efficient.

- What would they do to compare appliances if they didn't have the guidesheet?
- Would they use such a guidesheet if making a purchase?

*Conserving Energy Through Appliance Labeling (No. ST0109) 56 slides/ cassette can be ordered from:

Motion Picture Service
IFAS, Building 116
University of Florida
Gainesville, FL 32611
Phone: (904) 392-2411

1000 WATTS - 1 KILOWATT

$\frac{\# \text{ WATTS}}{1000}$ - $\# \text{ KILOWATTS}$

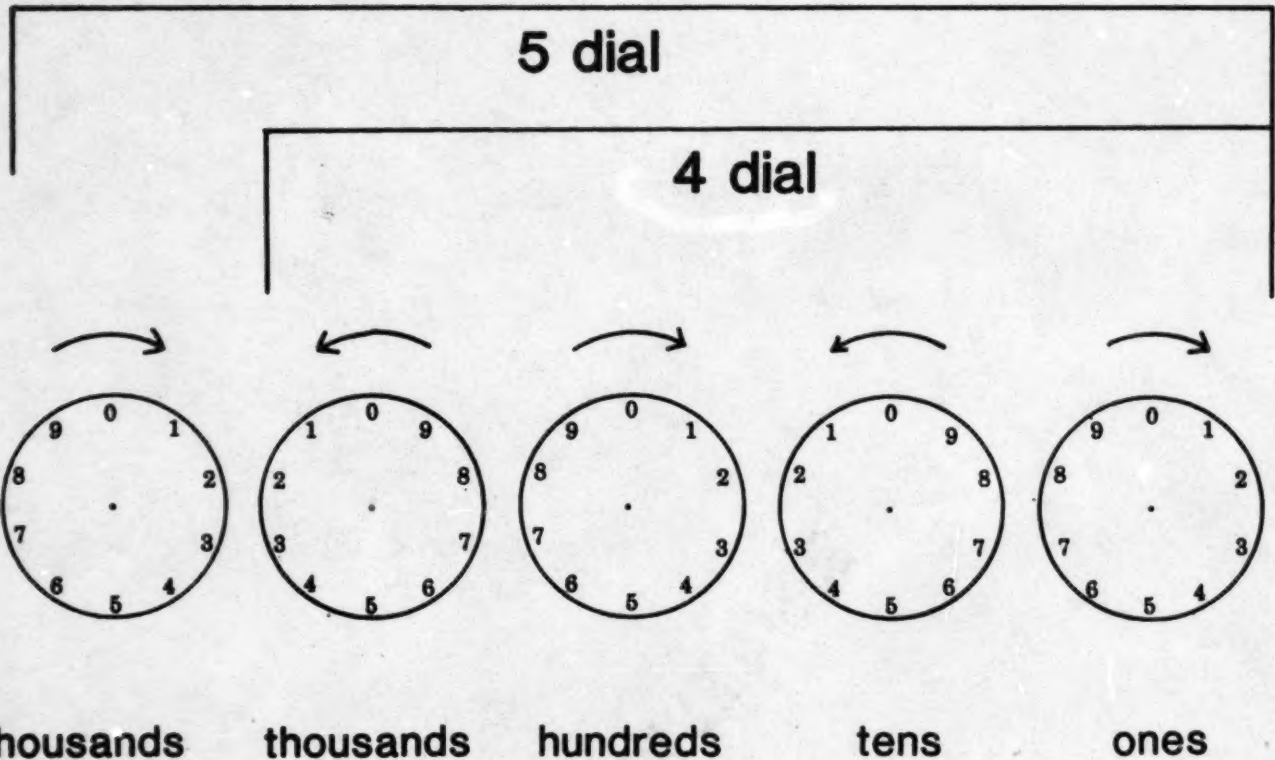
1 A

EXAMPLE: TOASTER

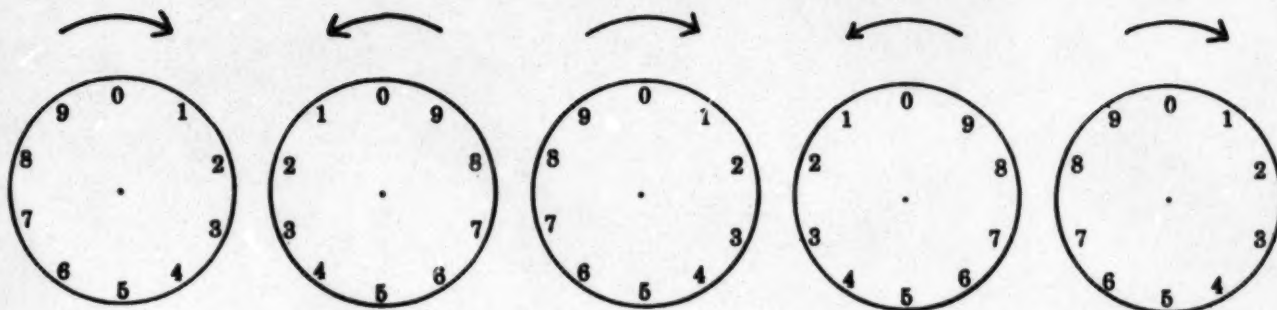
1100 WATTS

$$\frac{1100 \text{ WATTS}}{1000} = 1.1 \text{ KILOWATTS}$$

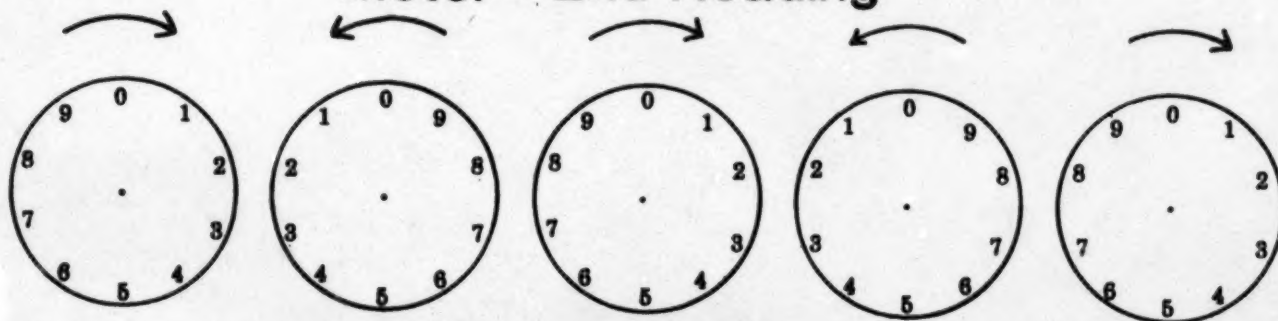
ELECTRIC METER



Meter — 1st Reading



Meter— 2nd Reading



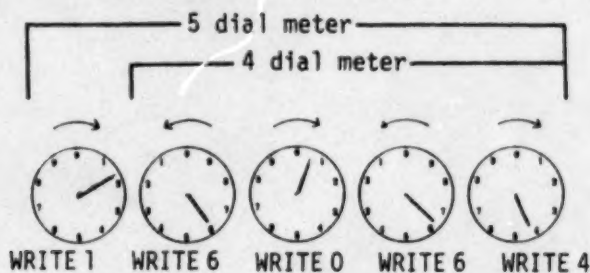
2nd meter reading

— 1st meter reading

— amount of energy
used (KWH)

HOW TO READ YOUR ELECTRIC METER

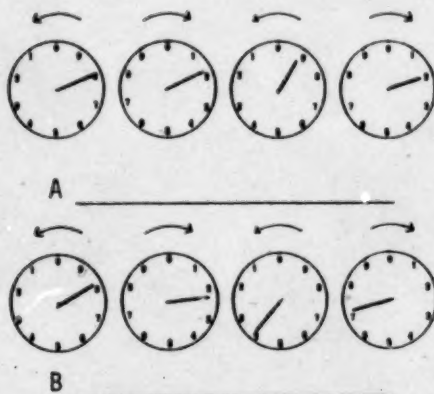
The dials are like watch faces lined in a row (every other dial moves counterclockwise). The reading for a five dial meter would be 16,064. The reading for a four dial meter would be 6,064.



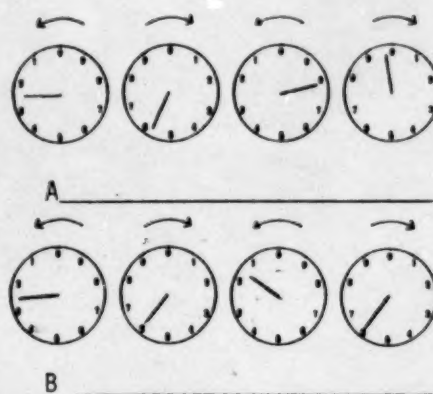
Notice that when the pointer is between two numbers, you should record the lower of the two numbers.

When the pointer seems to be directly on a number, look at the dial to the right, if the pointer on the right side dial has passed "0", then write down the number the pointer seems to be on; if the pointer on the right side dial has not passed "0", then write down the previous lower number on the dial you are recording.

METER NO. 1



METER NO. 2



Subtract the number of line A from the number on line B to find the number of KWH of electricity used.

Line B _____

Line B _____

Line A _____

Line A _____

KWH used _____

KWH used _____

Source: Energy and Man's Environment Curriculum Guide

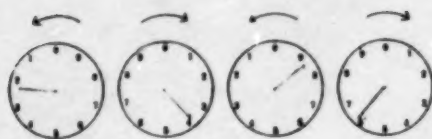
METER READING PROBLEMS

Problem 1.

Reading #1 _____

KWH Used _____

Reading #2 _____

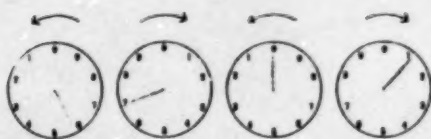


Problem 2.

Reading #1 _____

KWH Used _____

Reading #2 _____

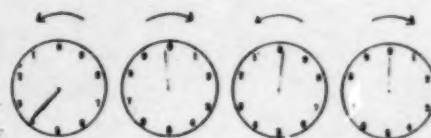
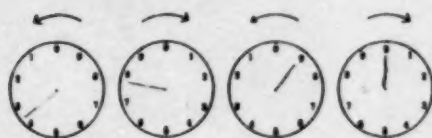


Problem 3.

Reading #1 _____

KWH Used _____

Reading #2 _____

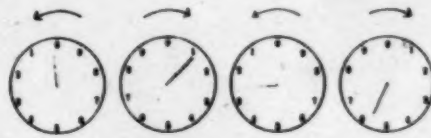


Problem 4.

Reading #1 _____

KWH Used _____

Reading #2 _____



KILOWATT HOUR -

KILOWATTS X TIME (in hours)

$\frac{\# \text{ WATTS}}{1000} \times \text{TIME (in hours)} = \text{KILOWATT HOUR}$

EXAMPLE: TOASTER

1100 watts

3 minutes

$$\frac{1100 \text{ watts}}{1000 \text{ watts/kilowatt}} \times \frac{3 \text{ minutes}}{60 \text{ minutes/hour}} = \text{KWH}$$

$$1.1 \text{ kilowatts} \times .05 \text{ hour} = .055 \text{ KWH}$$

4 B

HANDOUT



HOW MUCH DOES IT COST TO OPERATE YOUR APPLIANCES?

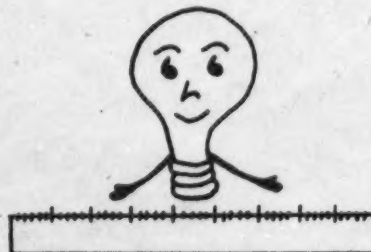


In order to better understand the cost of electricity, these definitions may help you understand the terms used in computing these costs:

*A watt is a measurement of electricity. A 100 watt light bulb uses 100 watts of electricity when lighted. Appliances and light bulbs are labeled with the watts or wattage they use.

*A kilowatt is 1000 watts.

*A kilowatt hour (KWH) is 1000 watts of electricity used for 1 hour. The use of a 100 watt bulb for 10 hours equals 1 KWH.



The cost of operating an appliance or light is determined by 3 factors:

- 1). the wattage
- 2). the number of hours it operates
- 3). the cost of electricity

The following tables are averages but by using them as a guide, you can approximate where energy dollars go:

APPLIANCE	TYPICAL WATTAGE	% "on" TIME	APPLIANCE	TYPICAL WATTAGE	% "on" TIME
BLANKET	150	50	DISPOSER	440	100
BLENDER	386	100	FAN - window	200	100
CAN OPENER	100	100	FRY PAN	1200	62
CLOCK	2	100	GRIDDLE	1200	76
CLOTHES DRYER	4856	100	HAIR-DRYER hand-held	600	100
COFFEEMAKER			IRON	1100	52
brew cycle	600	100	MICROWAVE OVEN	1450	100
warm cycle	80	100	MIXER - hand	80	100
CORN POPPER	575	100	- stand	150	100
DISHWASHER*	1200	100	RADIO	71	100

*Does not include use of hot water.

APPLIANCE	TYPICAL WATTAGE	% "ON" TIME	APPLIANCE	TYPICAL WATTAGE	% "on" TIME
RANGE	12,000	100	TOASTER	1100	100
sm. surface unit	1300	100	TOASTER OVEN		
(on high-medium)		50	toasting	1500	100
lg. surface unit	2400	100	oven	1500	26
(on high-medium)		50			
oven	2600	26	VACUUM CLEANER	630	100
broiler	3375	100			
SEWING MACHINE	75	100	WASHING MACHINE*		
SHAVER	15	100	automatic	512	100
			non-automatic	286	100
SLOW COOKER	200	100			
TELEVISION			WATER HEATER	360 KWH/month	
b & w - tube	160	100			
b & w - solid state	55	100	REFRIGERATOR/FREEZER		
color - tube	300	100	16 cu ft manual defrost	104 KWH/month	
color - solid state	200	100	14 cu ft frost-free	155 KWH/month	

*Does not include use of hot water.

Some appliances such as a clock, fan, or washing machine use electricity the entire time they are turned on. Other appliances such as an oven, iron or frypan cycle on and off. Estimates of "on" time are based on the time the heating element is "on" and will be less than the actual time the appliance switch is on.

FORMULA:
WATTAGE OF APPLIANCE
X ESTIMATED HOURS OF
USE DIVIDED BY 1000
AND MULTIPLIED BY 5
CENTS OR EXACT RATE.



Prepared by: KATHLEEN E. WOOD, Assistant Professor, Household Equipment Specialist
4/78

APPLIANCE CYCLING

$$\frac{\# \text{ watts}}{1000 \text{ watts/kilowatt}} \times (\text{time used} \times \text{time "on"})$$

— # KWH consumed

EXAMPLE:

IRON

1100 watts

used 20 minutes

52% "on" time

$$\frac{1100 \text{ watts}}{1000 \text{ watts/kilowatt}} \times (20 \text{ minutes} \times .52) =$$

$$1.1 \text{ KW} \times 10.4 \text{ minutes} =$$

$$1.1 \text{ KW} \times .17 \text{ hour} = 1.87 \text{ KWH}$$

5 B

HANDOUT
WATTAGE HUNT

<u>Appliance</u>	<u>Wattage</u>	<u>Appliance</u>	<u>Wattage</u>
Curling Iron	_____	Hair Blower	_____
Hand Mixer	_____	Can Opener	_____
Toaster	_____	Slow Cooker	_____
Portable Oven	_____	Cofeemaker(drip)	_____
Vacuum Cleaner	_____	Clock-radio	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

HANDOUT
WATTAGE HUNT

<u>Appliance</u>	<u>Wattage</u>	<u>Appliance</u>	<u>Wattage</u>
Curling Iron	_____	Hair Blower	_____
Hand Mixer	_____	Can Opener	_____
Toaster	_____	Slow Cooker	_____
Portable Oven	_____	Cofeemaker(drip)	_____
Vacuum Cleaner	_____	Clock-radio	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Name: _____

HANDOUT
MY ENERGY CONSUMPTION

List 10 household appliances that you use in one week. Write down the amount of time you use the appliance and the wattage. Figure the amount of KWH's that you use for each appliance and the total for all 10 appliances.

(Hint: If the appliance cycles, be sure to take this into consideration)

	<u>Appliance</u>	<u>Wattage</u>	<u>Time</u>	<u>KWH's Used</u>
1.	_____	_____	_____	_____
2.	_____	_____	_____	_____
3.	_____	_____	_____	_____
4.	_____	_____	_____	_____
5.	_____	_____	_____	_____
6.	_____	_____	_____	_____
7.	_____	_____	_____	_____
8.	_____	_____	_____	_____
9.	_____	_____	_____	_____
10.	_____	_____	_____	_____
TOTAL . . .				_____

Name: _____

HANDOUT

KWH's USED TO PREPARE FOOD

Each group is to prepare one of the following assigned foods. Each group will cook the food using two different appliances as indicated.

1. Keep track of the time that the foods take to cook in each of the appliances (also any preheat time).
2. Find the wattage of the appliance.
3. Calculate the KWH's used in preparing each of the foods. (consider cycling "on" of the appliance).
4. Determine which appliance used the least amount of energy to cook the food.
5. Explain why you think this appliance used less.
6. Report your findings to the class.

<u>Food</u>	<u>KWH's Used</u>
Frozen broccoli	
- on top of range	_____
- microwave oven	_____
Frozen TV dinner	
- oven	_____
- counter top portable oven	_____
Hamburger casserole	
- on top of stove	_____
- electric skillet	_____
Hamburger	
- burger cooker	_____
- electric skillet	_____
Dozen cookies	
- oven	_____
- microwave oven	_____
Hamburger	
- broiler	_____
- on top of stove (fry)	_____

Total KWH's Used to Prepare Foods Using High Energy Appliances: _____

Total KWH's Used to Prepare Foods Using Low Energy Appliances: _____

Difference: _____

Savings in cents if a KWH costs 15 cents each: _____

Name: _____

HOW MANY KWH's?

Set up and compute the answer to each of the five short story problems. Take into consideration if the appliance cycles on and off. You may use the handout "How Much Does It Cost to Operate Your Appliances?"

1. Mary used a 1500 watt toaster oven to bake chicken for one hour and ten minutes. For dinner she also: boiled potatoes to make mashed potatoes on a large range surface unit on high-medium for 20 minutes; warmed a can of green beans on a small surface unit for 5 minutes and baked a cake in the oven for 45 minutes. How much electricity did Mary use to cook this meal?
2. Ann dries and styles her hair each morning with a hand held dryer of 1000 watts which takes her 10 minutes and a curling iron of 40 watts which she uses for 10 minutes. How much energy does she use each morning.
3. Sally does the family laundry. Each week she washes 5 loads in the automatic washer of 512 watts and each load runs a total cycle of 25 minutes. She dries 6 loads in the electric dryer of 4856 watts, three of which are of heavy items which take 35 minutes each. The other three are light weight perma-press items which take 12 minutes to dry. How much energy does Sally use each week to do the family laundry not including the cost for heating the water?
4. Connie's family has the TV on from the time her brother gets home from school to watch cartoons until her parents watch the late night news. This is 8 hours each day. The same amount is used each day over the weekend. How many KWH's are used by Connie's family in watching TV which is 300 watts for a month of 30 days?
5. Judy listens to her 70 watt radio for five hours each day while she is at home in the morning and at night. How much energy does she use in a year to listen to her radio?

Answer Sheet
HOW MANY KWH's?

$$\begin{aligned}
 1. \quad & \frac{1500}{1000} \times \left(\frac{70}{60} \times .26\right) &= 1.5(1.1667 \times .26) = 1.5 \times .3033 &= .4550 \\
 & + \frac{2400}{1000} \times \left(\frac{20}{60} \times .5\right) &= 2.4 (.3 \times .5) = 2.4 \times .15 &= .360 \\
 & + \frac{1300}{1000} \times \left(\frac{5}{60} \times .5\right) &= 1.3 (.08 \times .5) = 1.3 \times .04 &= .052 \\
 & + \frac{2600}{1000} \times \left(\frac{45}{60} \times .26\right) &= 2.6 (.75 \times .26) = 2.6 \times .1950 &= .5070
 \end{aligned}$$

Total .. 1.3740 KWH's

$$\begin{aligned}
 2. \quad & \frac{1000}{1000} \times \frac{10}{60} &= 1 \times .16 &= .16 \\
 & \frac{40}{1000} \times \frac{10}{60} &= .04 \times .16 &= .0064
 \end{aligned}$$

Total .. .1664 KWH's

$$\begin{aligned}
 3. \quad & 5\left(\frac{512}{1000} \times \frac{25}{60}\right) &= 5(.512 \times .41) = 5(.20992) &= 1.0496 \\
 & + 3\left(\frac{4856}{1000} \times \frac{35}{60}\right) &= 3(4.856 \times .58) = 3(2.81648) &= 8.44944 \\
 & + 3\left(\frac{4856}{1000} \times \frac{12}{60}\right) &= 3(4.856 \times .2) = 3(.9712) &= 2.9136
 \end{aligned}$$

Total .. 12.41264

$$4. \quad \frac{300}{1000} = .300 \times 8 \text{ hours} = 2.4 \times 30 \text{ days} = 72.0 \text{ KWH}$$

$$5. \quad \frac{70}{1000} \times 5 = \text{KWH} \quad .07 \times 5 = .35 \text{ KWH} \quad .35 \times 365 \text{ days} = 127.75 \text{ KWH}$$

KWH X COST/KWH

-

COST OF USING ELECTRICITY
TO OPERATE APPLIANCE

EXAMPLE:

TOASTER

3 minutes @ 1100 watts = .055 KWH

Cost = 6 ¢ per KWH

.055 KWH X 6¢/KWH = .330 ¢

Name: _____

HANDOUT

WATT'S MY COST?

Use the chart of annual electrical usage of several household appliances that has previously been handed out. Using this information, figure the annual cost to a person for using each of the following appliances at 6¢ per KWH.

<u>Appliance</u>	<u>Annual KWH's</u>	<u>Annual Cost at 6¢/KWH</u>
AIR CONDITIONER	_____	_____
DRYER	_____	_____
DISHWASHER	_____	_____
FLUORESCENT LIGHTS	_____	_____
FREEZER	_____	_____
MIXER	_____	_____
FRYING PAN	_____	_____
HAIR DRYER	_____	_____
IRON	_____	_____
LIGHT BULBS	_____	_____
RADIO-PHONOGRAPH	_____	_____
RANGE WITH OVEN	_____	_____
REFRIGERATOR	_____	_____
COLOR TV	_____	_____
WASHER	_____	_____

TOTAL KWH'S: _____ TOTAL COST: _____

What would be the average monthly cost? _____

What would be the average monthly cost
if the fuel adjustment rate were
4.8¢/KWH? _____

HANDOUT

AVERAGE ANNUAL ELECTRICITY COST FOR
HOUSEHOLD APPLIANCES

	<u>Annual Energy Consumption (KWH)</u>	<u>@ 6¢/KWH</u>	<u>At Local KWH Rate</u>
AIR CONDITIONER (Room)	860	51.60	_____
ELECTRIC BLANKET	147	8.82	_____
CAN OPENER	0.3	.018	_____
CLOCK	17	1.02	_____
CLOTHES DRYER	993	59.58	_____
COFFEE MAKER	140	8.40	_____
DISHWASHER	363	21.78	_____
FAN (Ventilation)	291	17.46	_____
FAN (Furnace)	650	39.00	_____
FLUORESCENT LIGHT (Three fixtures)	260	15.60	_____
FOOD FREEZER	1,190	71.40	_____
FOOD MIXER	2	.12	_____
FOOD WASTE DISPOSER	7	.42	_____
FRYING PAN	100	6.00	_____
HAIR DRYER	25	1.50	_____
HOT PLATE (Two burner)	90	5.40	_____
IRON	60	3.60	_____
LIGHT BULBS	1,870	112.20	_____
RADIO	86	5.16	_____
RADIO/PHONOGRAPH	109	6.54	_____
RANGE WITH OVEN	700	42.00	_____
REFRIGERATOR (Frost-free, 17.5, CU. FT.)	2,250	135.00	_____

	<u>Annual Energy Consumption (KWH)</u>	<u>@ 6¢/KWH</u>	<u>At Local KWH Rate</u>
SEWING MACHINE	11	.66	_____
SHAVER	0.5	.03	_____
TELEVISION (Black & White)	100	6.00	_____
TELEVISION (Color)	320	19.20	_____
TOASTER	39	2.34	_____
VACUUM CLEANER	46	2.76	_____
WASHER (Automatic)	103	6.18	_____

Multiply the annual energy consumption (KWH) by the cost per KWH in your area to determine the annual cost of energy consumed.

HANDOUT

PROBLEMS IN CALCULATING KWH's COSTS

Use Handouts "How Much Does It Cost to Operate Your Appliances?" and "Average Annual Electricity Cost For Household Appliances" to solve these problems:

1. What is the monthly cost of using a color, solid-state television?
2. How many kilowatt hours of energy will be used in a year if a household uses these 4 major appliances: washer; range; dishwasher; and refrigerator?
3. List six appliances used in your home. Show total kilowatt hours of energy consumed and total cost for a year.
4. Which of the appliances listed consumes the most energy? Do you think that this would be a true energy consumption for all households? Why?
5. How many kilowatt hours of energy will be consumed by use of a range in one month? What would be the cost of this amount of energy used?
6. How much would you save in one year if you did not iron your clothes?
7. How much would you save in one year if you did not dry your clothes in a clothes dryer?
8. How much does it cost a family each year for using fluorescent lights and incandescent light bulbs?
9. How much would it cost to use a toaster, coffee maker, can opener, blender, food mixer and a frying pan for one month? For a year?
10. How much energy would be consumed in one month by a hair dryer, radio, and clock? How much would this cost per year to operate these appliances? In what other methods could you get the same end result without using these appliances?

HANDOUT

YEARLY COST LABEL

Refrigerator-Freezer
Capacity 17 Cubic Feet

(Name of Corporation)
Model(s) AH683, AH684, AH687
Type of Defrost Full Automatic

ENERGYGUIDE

Estimates on the scale are based on a national average electric rate of 4.8¢ per kilowatt hour

Only models with 16.5 to 18.4 cubic feet are compared on the scale

Model with
lowest
energy cost
\$28

\$70

THIS MODEL

Model with
highest
energy cost
\$170

Your cost will vary depending on your local energy rate and how you use the product. This energy cost is based on U.S. Government standard 12¢.

How much will this model cost you to run yearly?

Yearly cost	
Cost per kilowatt hour	3¢ \$28
	4¢ \$67
	5¢ \$85
	6¢ \$113
	10¢ \$142
	12¢ \$170

Ask your salesperson or local utility for the energy rate (cost per kilowatt hour) in your area.

Important Removal of this label before consumer purchase is a violation of Federal law (42 U.S.C. 6285)

(FPM No. 3-10894)

HANDOUT

USE COST LABEL

Dishwasher
Capacity: Standard

(Name of Corporation)
Model(s) MR338, XL12, HA83

ENERGYGUIDE

Estimates on the scale are based on a national average electric rate of 4.0¢ per kilowatt hour and a natural gas rate of 36¢ per therm.

Only standard size dishwashers are used in the scale.

Electric Water Heater

Gas Water Heater

Model with lowest energy cost
\$62

\$73

Model with highest energy cost
\$82

THIS MODEL

Model with lowest energy cost
\$29

\$31

Model with highest energy cost
\$40

THIS MODEL

Your cost will vary depending on your local energy rate and how you use the product. (The energy cost is based on U.S. Government standard tests.)

How much will this model cost you to run yearly?

with an electric water heater

Loads of dishes per week	2 4 6 8 12					
	2	4	6	8	12	
Cost per kilowatt hour	3¢	\$7	\$15	\$22	\$29	\$44
	4¢	\$16	\$28	\$44	\$58	\$88
	6¢	\$22	\$44	\$66	\$88	\$132
	8¢	\$28	\$56	\$88	\$117	\$176
	9¢	\$37	\$73	\$110	\$146	\$220
	10¢	\$44	\$88	\$132	\$176	\$264

with a gas water heater

Loads of dishes per week	2 4 6 8 12				
	2	4	6	8	12
Cost per therm (100 cubic feet)	10¢	\$4 \$8	\$12	\$16	\$24
	9¢	\$5	\$11	\$16	\$22 \$33
	8¢	\$7	\$14	\$21	\$28 \$41
	4¢	\$8	\$17	\$25	\$33 \$50
	9¢	\$10	\$19	\$29	\$39 \$58
	8¢	\$11	\$22	\$34	\$45 \$67

Ask your salesperson or local utility for the energy rate (cost per kilowatt hour or therm) in your area, and for estimated costs if you have a propane or oil water heater.

Important! Removal of this label before consumer purchase is a violation of Federal law (42 U.S.C. 6383).

EPRI Form 7-1000

HANDOUT

ENERGY EFFICIENCY RATIO LABEL

Room Air Conditioner
Capacity: 6,000 BTU/hr

(Name of Corporation)
Model(s) FD1801

ENERGYGUIDE

Models with the most efficient energy rating number use less energy and cost less to operate

Models with 1,200 to 7,200 BTU's cool about the same space

9.9

Least efficient model
5.6

▼

THIS MODEL

Most efficient model
18.2

▼ ▼

Your cost will vary depending on your local energy rate and how you use the product. This energy cost is based on U.S. Government standard rates

How much will this model cost you to run yearly?

Yearly hours of use		255	750	1050	2000	3000
	To find your cost per hour					
Cool per kilowatt hour	3¢	\$3	\$8	\$11	\$22	\$34
	4¢	\$6	\$17	\$22	\$45	\$67
	8¢	\$8	\$26	\$34	\$67	\$101
	9¢	\$11	\$34	\$46	\$90	\$134
	10¢	\$14	\$42	\$56	\$112	\$168
	12¢	\$17	\$50	\$67	\$134	\$202

Ask your salesperson or local utility for the energy rate (cost per kilowatt hour) in your area

Important! Removal of this label before consumer purchase is a violation of Federal law (42 U.S.C. 6262)

EPA Form 254-10

HANDOUT

GUIDESHEET ON HOW TO USE THE ENERGY GUIDE LABEL

First, you need to answer five questions

1. Are the appliances comparable in size and features? _____
2. What is the price of the energy-efficient model? _____
(model with lower yearly energy cost or higher energy efficiency rating)
What is the price of the standard model? _____
(model with higher yearly energy cost or lower energy efficiency rating)
3. How often will you use the product? _____
4. What is your local energy rate? _____ ¢/kWh
_____ ¢/therm
How much will each model cost you to run yearly, based on your local energy rate? (see grid)
Standard model _____
Energy-efficient model _____
5. How long do you expect to keep the appliance? _____

Then you can figure out whether you are better off buying the more energy-efficient appliance

First, calculate the price difference:

Cost of energy-efficient model \$ _____
minus cost of standard model _____
Price difference \$ _____

Second, estimate your annual energy-cost savings with the more energy-efficient model:

Annual energy cost of standard model \$ _____
minus annual energy cost of energy-efficient model _____
Annual energy-cost savings \$ _____

Third, calculate your energy-cost savings over the life of the appliance:

Annual energy-cost savings \$ _____
multiplied by years you expect to keep the appliance X _____ yrs
\$ _____
minus price difference _____
Energy-cost savings over life of appliance \$ _____

Finally, figure out how soon you can expect to recover your investment:

Price difference \$ _____
divided by annual energy-cost savings ÷ _____
Years to recover investment _____ yrs

TWO REFRIGERATOR-FREEZERS

\$485

Refrigerator-Freezer
Capacity 17 Cubic Feet

(Name of Corporation)
Model(s) AH503, AH504, AH507
Type of Defrost: Full Automatic

ENERGYGUIDE

Estimates on the scale are based on a national average electric rate of 4.9¢ per kilowatt hour

Only models with 10.5 to 18.4 cubic feet are compared in the scale

Model with lowest energy cost
\$59

\$70

Model with highest energy cost
\$88

THIS MODEL ▼

Your cost will vary depending on your local energy rate and how you use the product. This energy cost is based on U.S. Government standard tests.

How much will this model cost you to run yearly?

Yearly cost	
Cost per kilowatt hour	Estimated yearly cost
3¢	\$28
4¢	\$37
5¢	\$46
6¢	\$55
7¢	\$64
8¢	\$73
9¢	\$82
10¢	\$91
11¢	\$100
12¢	\$109

Ask your salesperson or local utility for the energy rate (cost per kilowatt hour) in your area.

Important Removal of this label before consumer purchase is a violation of federal law (42 U.S.C. 6302)

(Part No. 31-0024)

\$425

Refrigerator-Freezer
Capacity 17 Cubic Feet

(Name of Corporation)
Model(s) KR881-H
Type of Defrost: Full Automatic

ENERGYGUIDE

Estimates on the scale are based on a national average electric rate of 4.9¢ per kilowatt hour

Only models with 10.5 to 18.4 cubic feet are compared in the scale

Model with lowest energy cost
\$59

\$82

Model with highest energy cost
\$88

THIS MODEL ▼

Your cost will vary depending on your local energy rate and how you use the product. This energy cost is based on U.S. Government standard tests.

How much will this model cost you to run yearly?

Yearly cost	
Cost per kilowatt hour	Estimated yearly cost
3¢	\$33
4¢	\$66
5¢	\$99
6¢	\$132
7¢	\$165
8¢	\$198

Ask your salesperson or local utility for the energy rate (cost per kilowatt hour) in your area.

Important Removal of this label before consumer purchase is a violation of federal law (42 U.S.C. 6302)

(Part No. 31-0024)

\$250

Dishwasher
Capacity: Standard(Name of Corporation)
Model(s) NR328, XL12, NA83

ENERGYGUIDE

Estimates on the scale are based on a national average electric rate of 4.0¢ per kilowatt hour and a natural gas rate of 36¢ per therm.

Only standard size dishwashers are used in the scale

Electric Water Heater

Gas Water Heater

Model with
lowest
energy cost
\$62

\$73

Model with
highest
energy cost
\$82

THIS MODEL

Model with
lowest
energy cost
\$26

\$31

Model with
highest
energy cost
\$40

THIS MODEL

Your cost will vary depending on your local energy rate and how you use the product. The energy cost is based on U.S. Government standard tests.

How much will this model cost you to run yearly?

with an electric water heater

Loads of dishes per week	2	4	6	8	12
Cost per kilowatt hour	\$7	\$16	\$22	\$29	\$44
Cost per therm (100 cubic feet)	\$16	\$28	\$44	\$56	\$88
Cost per therm (100 cubic feet)	\$22	\$44	\$66	\$88	\$132
Cost per therm (100 cubic feet)	\$29	\$56	\$88	\$117	\$176
Cost per therm (100 cubic feet)	\$44	\$88	\$132	\$176	\$264

with a gas water heater

Loads of dishes per week	2	4	6	8	12
Cost per therm (100 cubic feet)	\$4	\$8	\$12	\$16	\$24
Cost per therm (100 cubic feet)	\$6	\$11	\$16	\$22	\$33
Cost per therm (100 cubic feet)	\$7	\$14	\$21	\$28	\$41
Cost per therm (100 cubic feet)	\$8	\$17	\$25	\$33	\$50
Cost per therm (100 cubic feet)	\$10	\$18	\$27	\$36	\$54
Cost per therm (100 cubic feet)	\$11	\$22	\$34	\$45	\$67

Ask your salesperson or local utility for the energy rate (cost per kilowatt hour or therm) in your area, and for estimated costs if you have a propane or oil water heater.

Important Removal of this label before consumer purchase is a violation of federal law (42 U.S.C. 6302)

(Part No. 13000)

\$230

Dishwasher
Capacity: Standard(Name of Corporation)
Model(s) CD1814, CL1950

ENERGYGUIDE

Estimates on the scale are based on a national average electric rate of 4.0¢ per kilowatt hour and a natural gas rate of 36¢ per therm.

Only standard size dishwashers are used in the scale

Electric Water Heater

Gas Water Heater

Model with
lowest
energy cost
\$62

\$89

Model with
highest
energy cost
\$82

THIS MODEL

Model with
lowest
energy cost
\$26

\$38

Model with
highest
energy cost
\$40

THIS MODEL

Your cost will vary depending on your local energy rate and how you use the product. The energy cost is based on U.S. Government standard tests.

How much will this model cost you to run yearly?

with an electric water heater

Loads of dishes per week	2	4	6	8	12
Cost per kilowatt hour	\$9	\$17	\$26	\$36	\$52
Cost per therm (100 cubic feet)	\$17	\$34	\$52	\$69	\$103
Cost per therm (100 cubic feet)	\$26	\$52	\$78	\$104	\$156
Cost per therm (100 cubic feet)	\$34	\$69	\$104	\$138	\$207
Cost per therm (100 cubic feet)	\$43	\$87	\$130	\$173	\$260
Cost per therm (100 cubic feet)	\$52	\$104	\$156	\$208	\$312

with a gas water heater

Loads of dishes per week	2	4	6	8	12
Cost per therm (100 cubic feet)	\$5	\$10	\$15	\$19	\$29
Cost per therm (100 cubic feet)	\$7	\$13	\$20	\$26	\$39
Cost per therm (100 cubic feet)	\$8	\$17	\$25	\$33	\$50
Cost per therm (100 cubic feet)	\$10	\$20	\$30	\$40	\$60
Cost per therm (100 cubic feet)	\$12	\$24	\$36	\$47	\$71
Cost per therm (100 cubic feet)	\$13	\$27	\$41	\$54	\$81

Ask your salesperson or local utility for the energy rate (cost per kilowatt hour or therm) in your area, and for estimated costs if you have a propane or oil water heater.

Important Removal of this label before consumer purchase is a violation of federal law (42 U.S.C. 6302)

(Part No. 13000)

TWO AIR CONDITIONERS

\$350

Room Air Conditioner
Capacity: 6,000 BTU/hr

(Name of Corporation)
Model(s) SA 714, SA 718

ENERGYGUIDE

Models with the most efficient
energy rating number use less
energy and cost less to operate

Models with 5,200 to
7,000 BTU's cool
about the same space

7.3

Least efficient
model
5.8

Most efficient
model
10.2

THIS MODEL

Your cost will vary depending on your local energy rate and how
you use the product. This energy cost is based on U.S. Government standard tests

How much will this model cost you to run yearly?

Yearly hours of use		350	750	1000	2000	3000
		Estimated yearly energy cost				
Cool per blowout hour	2¢	\$4	\$12	\$16	\$33	\$40
	4¢	\$8	\$26	\$33	\$66	\$99
	6¢	\$12	\$37	\$40	\$99	\$148
	8¢	\$16	\$49	\$56	\$132	\$197
	10¢	\$20	\$62	\$62	\$164	\$247
	12¢	\$24	\$74	\$80	\$197	\$290

Ask your salesperson or local utility for the energy rate (cost per kilowatt hour) in your area

Important Removal of this label before consumer purchase is a violation of
federal law (42 U.S.C. 6302)

EP-100 No. 200-10

\$300

Room Air Conditioner
Capacity: 6,000 BTU/hr

(Name of Corporation)
Model(s) AH500D

ENERGYGUIDE

Models with the most efficient
energy rating number use less
energy and cost less to operate

Models with 5,200 to
7,000 BTU's cool
about the same space

5.7

Least efficient
model
5.8

Most efficient
model
10.2

THIS MODEL

Your cost will vary depending on your local energy rate and how
you use the product. This energy cost is based on U.S. Government standard tests

How much will this model cost you to run yearly?

Yearly hours of use		350	750	1000	2000	3000
		Estimated yearly energy cost				
Cool per blowout hour	2¢	\$5	\$16	\$21	\$42	\$63
	4¢	\$11	\$32	\$42	\$84	\$126
	6¢	\$16	\$47	\$63	\$126	\$189
	8¢	\$21	\$63	\$84	\$168	\$252
	10¢	\$26	\$79	\$106	\$210	\$315
	12¢	\$32	\$95	\$126	\$252	\$378

Ask your salesperson or local utility for the energy rate (cost per kilowatt hour) in your area

Important Removal of this label before consumer purchase is a violation of
federal law (42 U.S.C. 6302)

EP-100 No. 200-10